



Change Request #54, WBS 2.4 Far Detector Installation

NuMI PMG Meeting - September 12, 2000

David Ayres, WBS 2.4 co-Manager

CR#54 Motivation

- Bring WBS 2.4 into agreement with current plans
 - » Recent Soudan site schedule changes
 - » Tasks in outfitting contract now fully defined
 - » Detailed engineering and prototype results
- Update cost estimates for SWF, M&S, overheads
- Add previously omitted tasks and costs
- Move Soudan Lab operating costs out of WBS 2.4
- Revise task structure for easier maintenance
- Add trackable milestones during detector assembly



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- **Schedule changes result from Soudan excavation delay**
 - » Original July 2000 completion date delayed to November 2000
 - » New installation schedule still meets Level 2 & 3 DOE Milestone dates
 - * First CR tracks in Aug. 2001 (was July 2001, DOE MS = Sept. 2001)
 - * SM1 complete June 2002 (was March 2002, DOE MS = July 2002)
 - * SM2 complete June 2003 (was Feb. 2003, DOE MS = June 2003)
- **Net WBS 2.4 cost increase = \$760k (to \$5.57M)**

<u>Task</u>	<u>Cost change</u>
Minecrew effort cost	+\$477k
Lab infrastructure M&S	+\$176k
DNR hoisting & labor	+\$270k
Tasks moved to Operating budget	-\$171k
Overhead cost changes	-\$ 8k
Other costs	<u>+\$ 16k</u>
Total	<u>+\$760k</u>



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- **Rework installation plan in light of schedule changes**
 - » Start of underground outfitting work delayed to Nov. 15, 2000
 - » Add Surface Building beneficial occupancy date: Jan. 2, 2001
 - » Add Mezzanine beneficial occupancy date: Jan. 15, 2001
 - » MINOS cavern beneficial occupancy delayed to May 1, 2001
- **Task structure simplification**
 - » NuMI Master Project file has only rolled-up WBS 2.4 tasks after CR#54
 - » Detailed Minecrew task assignments now in a separate Project file
 - * Separate, integrated-schedule Project file determine effort profile
 - » Coordinate WBS 2.4 Minecrew effort with Lab & Expt operations effort



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- **Minecrew effort cost increase = \$477k**
 - » Supervisor, Admin Asst, Elec. Tech moved to Soudan Operating Budget
 - » Peak installation Minecrew level reduced from 38 to 35.5 FTE
 - » Minecrew effort ramp-up accelerated during set-up period
 - » Minecrew salary levels raised to current Iron-range levels
 - » Univ. of Minnesota fringe benefit increased, 24.4% → 30.3%
 - » Baseline Minecrew effort cost: \$4,037k → \$4,514k ⇒ \$477k increase
- **Infrastructure setup cost increase = \$295k**
 - » Outfitting Contract & remaining Minecrew setup tasks now well defined
 - » Setup M&S cost increase = \$176k, from \$47k to \$223k
 - » Setup SWF cost increase = \$119k, from \$89k to \$208k (included above)



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- **DNR hoisting and effort cost increase = \$270k**
 - » Number of hoist trips increase by $\sim 2\times$ to cover *all* detector components
 - » Include use of DNR staff to perform or assist with installation tasks
 - » Per-trip hoist charges increase = \$188k, from \$132k to \$320k
 - » DNR Hoistman effort increase = \$54k, from \$388k to \$442k
 - » DNR staff assistance cost increase = \$28k (was \$0)
- **Tasks moved *out* of WBS 2.4 to “Operating” = \$171k**
 - » Minecrew training travel to FNAL = \$19k
 - » Office and shop equipment = \$86k
 - » Surface materials handling equipment = \$50k
 - » Communications equipment (LAN,...) = \$16k



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- **Change in Univ. of Minn. Overhead charges = -\$8k**
 - » Baseline cost estimate used 0% OH for all M&S (increased to 26%)
 - » Equipment over \$2k still has 0% OH
 - » All payments to DNR (hoisting, effort,...) now have OH = 5%
 - » FNAL OH charges decreased to 0% (financial plan transfer to UofM)
- **Summary**
 - » Schedule changes are consistent with DOE milestone dates
 - » Supermodule 2 is complete three months before beam turnon
 - » Current cost estimate is more reliable than previous estimate
 - * Outfitting contract now well defined
 - * Materials handling procedures and equipment now well understood
 - * 4-plane prototype has validated detector installation procedures
 - » \$760k increase in WBS 2.4 cost estimate does not include Soudan facility operations costs which were previously in WBS 2.4